

COMBINATION CONNECTOR SHELL

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention relates to an electric connector and,
5 more specifically, to a combination connector shell for electric connector, which is comprised of a front housing, a rear housing, and a terminal holder that are connected to one another by hook joints and prohibited from horizontal and vertical displacement relative to one another.

10 2. Description of the Related Art:

Following fast development of computer technology, various versatile electric connectors are developed for signal transmission in computer networks. For example, an electric connector may be provided with a LED indicator circuit to indicate
15 different signal transmission status or failure of the circuit. Regular RJ45 connectors are commonly used for digital communication. These connectors generate high frequency electric waves that interfere with surrounding electric apparatus. Further, the internal transmission signal tends to be interfered noises
20 produced in the external cable. In order to eliminate EMI (electromagnetic interference), a metal shield or filter module may be used. When a filter module is used, the filter module must be installed within the circuit board and the terminal holder in the

electrically insulative housing. After installation, the positive connection between the housing and the terminal holder and the electric connection among the terminals, the filter module and the circuit board must be well checked, assuring accurate signal
5 transmission.

FIGS. 10 and 11 show an electric connector according to the prior art. According to this design, the electric connector comprises a first terminal holder **B** holding a set of first terminals **B1**, a second terminal holder **D** holding a set of second terminals **D1**, an electrically insulative housing **A** adapted to accommodate the terminal holders **B** and **D**, the insulative housing **A** having two backward hook arms **A1**, a circuit board **C** to which the first terminals **B1** and the second terminals **D1** are soldered, the circuit board **C** having two side notches **C1** and **C2** respectively forced
10 into engagement with the hook arms **A1**, and a metal shield **E** covering the housing **A**. This structure of electric connector has drawbacks. When soldering the terminals **B1** and **D1** to the circuit board **C**, the terminal holders **B** and **D** interfere with the soldering operation. Further, simply using the hook arms **A1** to hold the
15 circuit board **C** cannot prohibit vertical displacement of the circuit board **C** relative to the insulative housing **A**.

FIGS. 12 and 13 show another structure of electric connector according to the prior art. This structure of electric

connector is comprised of an outer housing, an inner housing, and a terminal holder. The main advantage of this structure of electric connector is its detachable structural design, i.e. either of the outer housing, the inner housing and the terminal holder is
5 replaceable when damaged. According to this design, the connection of the terminal holder with the terminals and the circuit board is complicated. The terminal holder is inserted into the inner housing and then the outer housing after installation of the circuit board in the terminal holder. The hook joint between
10 the terminal holder and the inner housing cannot prohibit vertical displacement of the terminal holder relative to the inner housing and the outer housing. Further, it is difficult to solder terminals to the circuit board within a limited space.

Therefore, it is desirable to provide a combination
15 connector shell for electric connector that eliminates the aforesaid drawbacks.

SUMMARY OF THE INVENTION

The present invention has been accomplished under the circumstances in view. According to one aspect of the present
20 invention, the combination connector shell comprises an electrically insulative front housing adapted to hold first terminals, an electrically insulative rear housing abutted against the rear coupling side of the front housing, a terminal holder attached to

the bottom side of the rear housing and adapted to hold second terminals, a second coupling structure adapted to lock the rear housing to the front housing, and a first coupling structure adapted to lock the terminal holder to the rear housing. According to 5 another aspect of the present invention, the terminal holder has a top receiving space adapted to accommodate a circuit board, for enabling a filter module and other electronic component parts as well as the first and second terminals to be conveniently soldered to the circuit board. According to still another aspect of the 10 present invention, the terminal holder further comprises two stop rods bilaterally extended from the front side for insertion into insertion slots in the front housing to prevent horizontal displacement of the terminal holder relative to the front housing.

BRIEF DESCRIPTION OF THE DRAWINGS

15 FIG. 1 is an elevational view of a combination connector shell according to the present invention.

FIG. 2 is an exploded view of the combination connector shell according to the present invention.

20 FIG. 3 is another exploded view of the combination connector shell according to the present invention when viewed from another angle.

FIG. 4 is a schematic sectional view showing the coupling structure between the rear housing and the terminal holder

according to the present invention.

FIG. 5 is a sectional assembly view of FIG. 4.

FIG. 6 is a schematic sectional view showing the coupling structure between the front housing and the rear housing according to the present invention.

FIG. 7 is a sectional assembly view of FIG. 6.

FIG. 8 is an exploded view of an electric connector constructed according to the present invention.

FIG. 9 is an elevational assembly view of the electric connector shown in FIG. 8.

FIG. 10 is an exploded view of an electric connector according to the prior art.

FIG. 11 is an exploded view in an enlarged scale of a part of the electric connector shown in FIG. 10.

FIG. 12 is an exploded view of another structure of electric connector according to the prior art.

FIG. 13 is a sectional assembly view of the electric connector shown in FIG. 12.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1~3, a combination connector shell in accordance with the present invention is shown comprised of an electrically insulative front housing 1, an electrically insulative rear housing 2, and a terminal holder 3.

The front housing 1 comprises a front receiving chamber 11, a rear coupling side 12, two front insertion holes 13 bilaterally horizontally extended through the rear coupling side 12 at the top of the front receiving chamber 11, insertion slots 111 cut through 5 the bottom wall of the front receiving chamber 11 and a part of the rear coupling side 12, a rack 121 backwardly protruded from the rear coupling side 12 near the bottom, and two springy hooks 41.

The rear housing 2 is shaped like a hollow rectangular frame defining a center opening 21, having two front hooks 42 10 bilaterally forwardly extended from the front coupling side 22 and two bottom hooks 51 bilaterally downwardly extended from the bottom wall. The front hooks 42 and the springy hooks 41 form a coupling structure 4.

The terminal holder 3 comprises a top receiving space 31, 15 a plurality of terminal slots disposed at the bottom side of the top receiving space 31, two stop rods 33 bilaterally forwardly extended from the front coupling side 32 at the bottom, and two vertical hook holes 52 disposed at two sides of the front coupling side 32 corresponding to the bottom hooks 51. The bottom hooks 20 51 and the hook holes 52 form a coupling structure 5.

The assembly process of the combination connector shell is outlined hereinafter with reference to FIGS. 4~7. The terminal holder 3 is secured to the bottom side of the rear housing 2 by

forcing the hook holes **52** into engagement with the bottom hooks **51**. After connection of the terminal holder **3** to the rear housing **2**, the front coupling side **22** of the rear housing **2** is attached to the rear coupling side **12** of the front housing **1** to force the front **5** hooks **42** into engagement with the springy hooks **41** and to insert the stop rods **33** into the insertion slots **111**, for enabling the terminal holder **3** to be supported on the rack **121**.

Referring to FIGS. 8 and 9, the top receiving space **31** of the terminal holder **3** is adapted to accommodate a circuit board **311**, a filter module **312**, and other electronic components. Because the top receiving space **31** is an open space without barriers around the border area, first terminals **313** and second terminals **314** can conveniently be soldered to the circuit board **311**. The first terminals **313** are respectively mounted in the **15** insertion slots **111** inside the front housing **1**. The front insertion holes **13** of the front housing **1** are adapted to accommodate a respective LED (light emitting diode) **131**. The circuit board **311** is mounted in the top receiving space **31** inside the terminal holder **3** before connection of the terminal holder **3** to the rear housing **2**. **20** After connection of the terminal holder **3** to the rear housing **2**, the circuit board **311** is disposed within the center opening **21** of the rear housing **2**. Thereafter, a top cover **23** is covered on the rear housing **2** to block the center opening **21**.

A prototype of combination connector shell has been constructed with the features of FIGS. 1~9. The combination connector shell functions smoothly to provide all of the features discussed earlier.

5 Although a particular embodiment of the invention has been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

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